Immunostimulatory effects of fermented vegetable products on the non-specific immunity of Japanese flounder *Paralichthys olivaceus*

Fisheries Science 2005; **71**: 257-262

Takayuki Ashida[a,b] and Eiji Okimasu[b]

[a]*Manda Fermentation Co. Ltd, Innoshima, Hiroshima 722-2192,Japan*

[b]*Department of Marine Biotechnology, Faculty of Life Science and Biotechnology, Fukuyama University, Fukuyama, Hiroshima 729-0292, Japan.*

The stimulatory effect of fermented vegetable product (FVP) upon the phagocytic and superoxide generation of leukocytes was studied in Japanese flounder *Paralichthys olivaceus*. The phagocytic activity of casein-induced, intraperitoneal leukocytes was investigated and quantified, that is the activity significantly increased (P <0.05 or <0.01) by the addition of FVP beyond 3mg/kg body weight. Further analysis investigated the effect of FVP on superoxide generation in leukocytes. Established *in vitro* cytochrome c reduction assay was used to measure superoxide generation; reduced levels of FVP in assay samples had a profound effect on superoxide generation. FVP was also incorporated in commercial diets and fed to Japanese flounder for 4 weeks. The phagocytic activities and superoxide generation of peritoneal induced leukocytes were significantly higher (P <0.05, <0.01) in fish fed the FVP supplemented diet than fish fed the control diet. FVP feeding in fish had a significantly higher (P <0.05) activity of lysozyme than in the control fish.